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Insights in the possibilities of an electromagnetic induction sensor to map the military remains, buried in the former World War 1 front zone

Nicolas Note – Ghent University - Department of soil management, Belgium

Timothy Saey – Ghent University - Department of soil management, Belgium

Wouter Gheyle – Ghent University - Department of Archaeology, Belgium

Birger Stichelbaut – Ghent University - Department of Archaeology, Belgium

Hanne Van den Berghe – Ghent University - Department of Geography, Belgium

Veerle Van Eetvelde – Ghent University - Department of Geography, Belgium

Jean Bourgeois – Ghent University - Department of Archaeology, Belgium

Marc Van Meirvenne – Ghent University - Department of soil management, Belgium

On November 11th 1918, the military impact on the Western front zone was called to an end. Almost a hundred years later, traces of this war are still reflecting in the landscape: cemeteries, mine and shelling craters, bunkers, high concentrations of metal shrapnel, bomb shells rising from the subsoil, etc. ... These above surface remains are easy to identify in the current landscape. A more rising question is what is still buried beneath the surface. This unknown data is one of the research topics in the UGent's integrated research project 'Non-invasive landscape archaeology of the Great War' (2014-2018). For this project, 220 ha were already scanned at the former front zone in Belgium with an electromagnetic induction sensor (EMI) by the Department of Soil Management to investigate the buried remains of this War. Site selection and archaeological feature interpretation of the scan results were guided by the expertise and photograph database of the Centre for Historical and Archaeological Aerial Photography (Ghent University, In Flanders Fields Museum). This collaboration opened up a series of insights in the possibilities and limitations to investigate buried WW1 archaeological structures in a non-invasive way. Because of the scale and the spread of the EMI-surveys, we can compare data parameters collected at several locations in this formal war zone. For example: by applying a metal filter on the EMI data, we perceive that fields in the northern area of the Belgian front zone indicate a lower rate of metal shrapnel than the southern part. Our research showed also that EMI metal parameters can be correlated with the shelling densities seen on historical aerial photographs. Based on this secondary data source which almost entirely covers the front zone, the level of metal shrapnel pollution can be simulated for this region. Only field validations (excavations) of metal objects are the missing link to simulate metal quantities, buried beneath Flanders Fields.

keywords: *World War One, Electromagnetic induction, Soil scan, Destruction map, Historical aerial photographs*

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WAGENINGEN 2017

Wageningen, 26 June – 1 July 2017